ments, some of the actions may be omitted, added, modified, skipped, or the like without departing from the scope of the invention.

[0072] FIG. **3** is a flow diagram illustrating a method **300** for predicting life of the reconfigurable battery pack **100** based on the load deviation, according to an embodiment, as disclosed herein. The sequence blocks (**302** to **310**) is performed by using the controller **102**. The controller **102** is operated with the microcontroller, the microprocessor, or any computer readable storage medium in the battery management system **100**. At **302**, the method **300** includes identifying the SOH of the degraded cells, the capacity fade, and the number of battery modules of the reconfigurable battery pack **110**. At **304**, the method **300** includes determining the load deviation based on the capacity fade. At **306**, the method **300** includes determining whether the load deviation is exceeding, meeting, or approaching the threshold. In an embodiment, the threshold is defined by the user. In an embodiment, the threshold is automatically pre-configurable by the usage pattern, history, or based on thresholds established for similar configurations. If the load deviation is exceeding the threshold then, at **308**, the method includes detecting the end of life of the reconfigurable battery pack **100**. If the load deviation is not exceeding the threshold then, at **308**, the method is operated as per the normal operation condition.

[0073] The method **300** is provided such that substantially all battery modules or cells are used approximately equally to balance the load of the reconfigurable battery pack **100**, so that the load deviation is used as an indicator for the fade estimation. This results in an accurate prediction of life of the reconfigurable battery pack **100** without excessive user intervention or overly complex computation.

[0074] The various actions in the method **300** may be performed in the order presented, in a different order or simultaneously. Further, in some embodiments, some of the actions may be omitted, added, modified, skipped, or the like without departing from the scope of the invention.

[0075] FIG. **4** is a flow diagram illustrating the method **400** for predicting life of the reconfigurable battery pack **100** based on the capacity fade, according to an embodiment as disclosed herein. The sequence of blocks **402** to **410** is performed using the controller **102**. The controller **102** is operated with the microcontroller, the microprocessor, and/or any computer readable storage medium in the battery management system **100**. At step **402**, the method includes identifying the SOH of the degraded cells, the load deviation, and the number of battery modules or cells of the reconfigurable battery pack **110**. At **404**, the method includes determining the capacity fade based on the load deviation. At **406**, the method includes determining whether the capacity fade is exceeding the threshold. In an embodiment, the threshold is defined by the user. In an embodiment, the threshold is automatically pre-configurable by the usage pattern. If the capacity fade is exceeding the threshold, then the method at **408** includes detecting the end of life of the reconfigurable battery pack. If the capacity fade is not exceeding the threshold, then the method **410** is operated as per the normal operation condition.

[0076] The method **400** is provided such that substantially all battery modules are used about equally to balance the load of the reconfigurable battery pack **100**, so that the capacity fade is used as the indicator for the fade estimation. This results in predicting life of the reconfigurable battery pack **100** without any excessive user intervention or any overly complex computation.

[0077] The various actions in the method **400** are performed in the order presented, in a different order, or simultaneously. Further, in some embodiments, some of the actions may be omitted, added, modified, skipped, or the like without departing from the scope of the invention.

[0078] FIG. **5** is a graph depicting a cycle time versus number of cycles for the reconfigurable battery pack **110**, where one or more battery cell **112** of the reconfigurable battery pack **110** is aged to a substantially different level relative to other cells, and other battery cells **112** of the reconfigurable battery pack **110** are fresh cells, according to an embodiment as disclosed herein. A 6S5P pack, for example, is simulated using an electrochemical model taking into account the degradation mechanisms at electrodes. The reconfigurable battery pack **110** is configured in different forms (e.g. 4S5P+2S5P, 2S5P+4S5P, 3S5P+**3**S5P). In an embodiment, the various configurations are then cycled with one of the cells always held at the same initial SOH. In an embodiment, this pack **110** is then cycled with one of the cells held each time at various levels of aging.

[0079] FIG. **6** is a graph depicting a capacity versus cycles for different combinations of the reconfigurable battery pack **110** where the initial state of degradation of the aged module is kept the same, according to an embodiment as disclosed herein. FIG. **7** is a graph depicting a current deviation versus a capacity fade for different configurations of the reconfigurable battery pack **110** where the initial degradation of the aged module is kept the same, according to an embodiment as disclosed herein. In the FIGS. **6** and **7**, the 6S5P pack is simulated using an electrochemical model taking into account the degradation mechanisms at electrodes. The reconfigurable battery pack **110** is configured in different forms (4S5P+2S5P, 2S5P+4S5P, 3S5P+3S5P). The various configurations are then cycled with one of the modules always held at the same initial SOH. As shown in the FIG. **7**, at the same current deviation, different configurations have different capacity fades. For example, for a configuration having about 0.4 (or 40% or approximately 4 out of every 10) fresh cells and about 0.6 (60%) aged cells at an SOH of about 0.77, the capacity fade is different when compared with a configuration having about 0.6 fresh cells and about 0.4 aged cells at an SOH of about 0.77. Similarly, for a configuration having about 0.4 fresh cells and about 0.6 aged cell at an SOH of about 0.77, the capacity fade is different when compared with a configuration having about 0.8 fresh cells and about 0.2 aged cells at an SOH of about 0.77.

[0080] FIG. **8** illustrates a computing environment **802** implementing a mechanism for predicting life of the reconfigurable battery pack **110**, according to an embodiment as disclosed herein. As depicted in the figure, the computing environment **802** comprises at least one processing unit **808** that is equipped with a controller **804**, an Arithmetic Logic Unit (ALU) **806**, a memory **810**, a storage memory **812**, a plurality of networking devices **816** and a plurality Input output (I/O) devices **814**. The processing unit **808** is responsible for processing instructions. The processing unit **808** receives commands from the controller **804** in order to perform its processing. Further, any logical and arithmetic operations involved in the execution of the instructions are computed with the help of the ALU **806**.